

Automation brings dramatic improvement to hospital microbiology lab main workflow

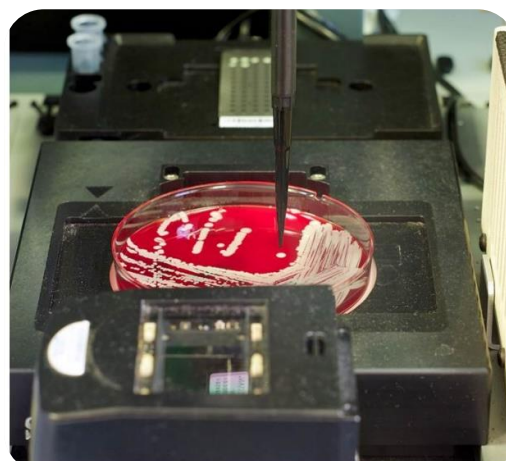
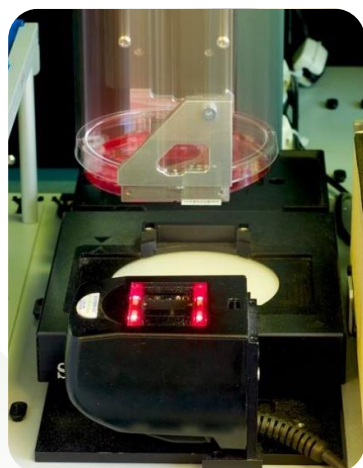
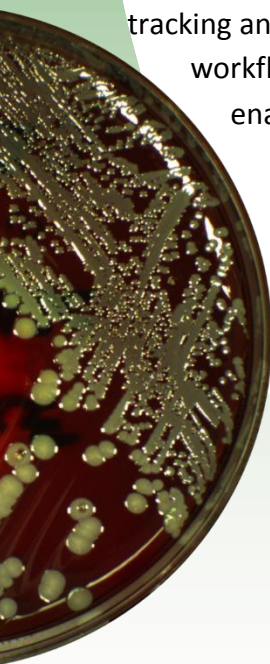
A joint innovative project by Tecan, SciRobotics, Alere and the Hospital of Treviso microbiology lab demonstrates dramatic improvement in workflow efficiency.

Background

Recent modern technologies in the field of microbiology such as the MALDI-TOF mass-spectrometry microbial identification, and quantitative antibiotic susceptibility test (AST and MIC determination) enable an improved and timely identification and treatment for the patient. Still, much of the sample preparation for these diagnostic tests remains manual and labor intensive. Labs are challenged preventing human error and sustaining a chain of custody to track and document results, without further increasing operational cost. Since the middle of 2014, an innovative automation project by Tecan, SciRobotics and Alere, performed with the microbiology lab at the hospital of Treviso, brings the promise to dramatically improve the identification and AST preparation workflow. The solution which is based on Tecan's laboratory robots, SciRobotics PickoloMI™ colony-picking module and B.A.S.E middleware¹, enables high-quality and timely sample processing and diagnostic results at dramatically reduced labor cost while providing comprehensive and precise documentation and medical information.

Experience at Treviso hospital

The solution operates successfully since April 2014 at the Treviso hospital lab, led by Dr. Rigoli, who is the head of the lab and who conceived the new workflow concept. The microbiology lab at this medium size hospital is processing 75-100 samples for identifications and AST daily. Thanks to the system's excellent performance the lab was able to implement the entire process to operate with a single employee, saving the work of 4 employees for the same tasks. The ease-of-use, precision and versatility of the picking capabilities provided by the PickoloMI™ module on the Tecan robot enables the automation of colony-picking for both MALDI sample preparation and AST whilst providing better tracking and documentation. Combined with B.A.S.E middleware software the new innovative workflow provides valuable and comprehensive information to doctors near bed side and also enables a regional view of epidemiology aspects for clinicians.



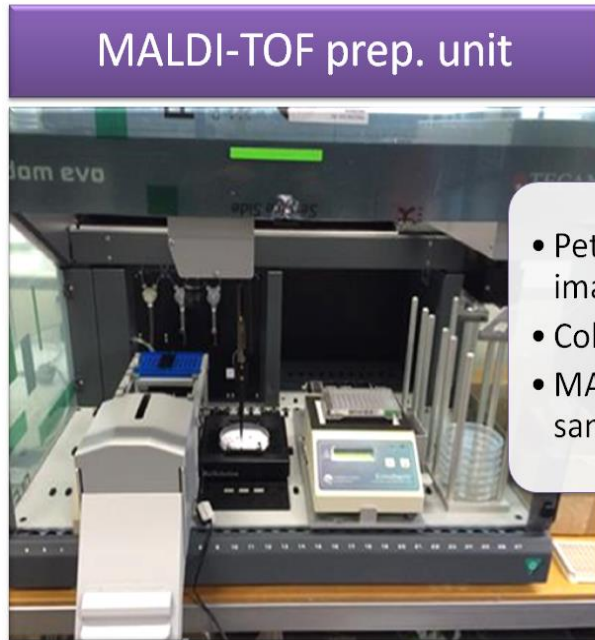
The solution

The entire process of MALDI-TOF sample preparation and the preparation of AST in the microbroth dilution technique which provides accurate MIC results is performed automatically. The solution is comprised of two Tecan liquid handling robots as well as SciRobotics PickoloMI™ module for microbial colonies handlings.

MALDI-TOF preparation unit:

The first part of the system, a Tecan Freedom EVO75® with the SciRobotics PickoloMI™ module, 2 pipetting channels, robotic arm and enough storage for 30 samples in Petri dish, executes the following tasks:

- **Pick defined colonies and smear on MALDI target**
- **Apply matrix to MALDI target**
- **Pick colonies for AST**
- **Automatic documentation by recording images of Petri dish and picked colonies**
- **Sample tracking and data transfer to MALDI-TOF instruments (e.g. BioMérieux VITEK-MS, Bruker Biotyper)**

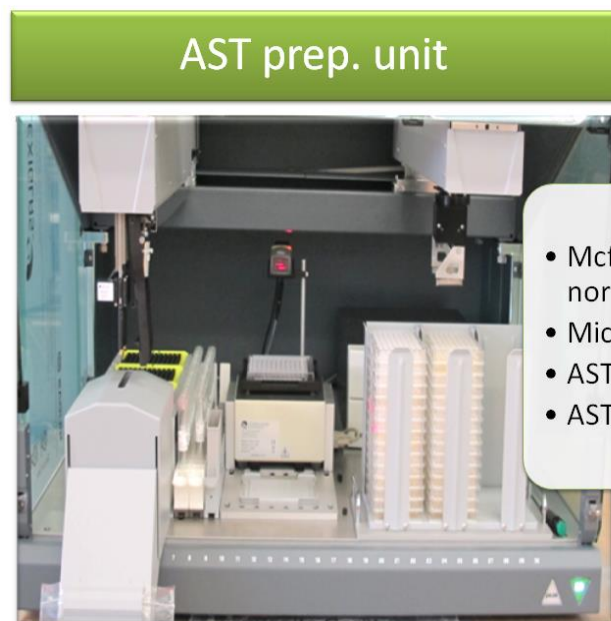


- Petri-dish imaging
- Colony-picking
- MALDI-TOF sample prep.

AST preparation unit:

The second part of the system, a Tecan Freedom EVO100® with 4 pipetting channels and robotic arm, performs a microplate based antibiotics susceptibility test. This unit can automatically process a batch of 30 samples including AST² preparation, result recording with Tecan Sunrise™ reader and result interpretation. In detail it executes the following tasks:

- **McFarland adjustment**
- **Inoculation of suspension media**
- **Inoculation of AST plates**
- **Reading, imaging and interpretation of AST test plates**
- **Automated sample tracking**



- Mcfarland 0.5 normalization
- Microbroth dilution
- AST preparation
- AST result reading

¹ B.A.S.E. middleware is a Product of BMS srl, Italy

²AST kits provided by Alere Italy srl

